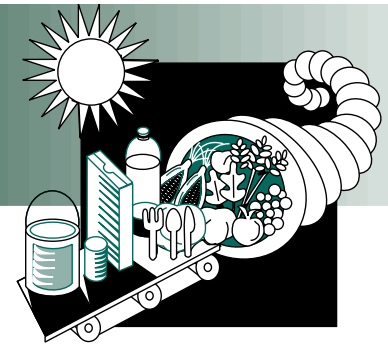


AGRICULTURE

Project Fact Sheet



SOY-BASED 2-CYCLE ENGINE OILS

BENEFITS

- Saves millions of gallons of oil used in recreational boating
- Reduces annual worldwide petroleum use
- Offers a product that is 90 to 100 percent biodegradable
- Produces fewer emissions
- Increases fire safety
- Enhances oxidative stability
- Extends engine life
- Potential 2020 target market is 10 million gallons per year of 2-cycle engine oils
- Projected 2020 fossil fuel displacement is 0.7 trillion Btu

APPLICATIONS

The potential market for a commercial vegetable lubricant for 2-cycle engines is worldwide, wherever water-cooled engines are in demand.

NEW VEGETABLE LUBRICANTS WILL BE AFFORDABLE AND ENVIRONMENTALLY BENIGN

About 15 million gallons of oil are consumed annually by the recreational boating sector in North America. Outboard motorboats and personal watercraft require 2-cycle oil to propel their water-cooled engines, which burn an oil-fuel mixture. Unburned oil and fuel are discharged into the water.

Researchers want to develop a biodegradable, soy-based oil that offers the same performance as petroleum-based products. An agricultural-based vegetable oil will be less expensive than petroleum or synthetic oils and offer other significant benefits to end users.

Vegetable lubricants will reduce annual petroleum use in boating. The new product will also be 90 to 100 percent biodegradable (versus 20 to 30 percent for petroleum) and less volatile than petroleum and synthetic products, with fewer environmental emissions of VOCs and particulates. With a flash point of 570°F, it will have a better fire safety record than alternative oils. Moreover, its inherent lubricity will reduce operating temperatures and engine wear in comparison to petroleum products.

RECREATIONAL BOATING SECTOR TO BENEFIT FROM BIODEGRADABLE VEGETABLE LUBRICANTS



Biodegradable, soy-based oils will be used in motorboats and personal watercraft.



Project Description

Goal: To develop, test, and screen a series of 2-cycle engine oils based on vegetable oils for use in water-cooled engines.

Terresolve Technologies has already developed an engine oil for use in air-cooled engines based on soy oil using their proprietary Enhanced Base Oil (XBO) additive. This project will utilize that technology and lessons learned, to develop a soy based oil formulated with XBO that is suitable for water-cooled marine engines. It will also be optimized with respect to viscosity, oxidative stability, low temperature performance, and other stability requirements.

This oil will be formulated to have certain physical and chemical properties as specified by the National Marine Manufacturing Association (NMMA).

Progress and Milestones

The following tasks and milestones will be accomplished:

- Blends of soy oils will be created using the XBO technology; proper physical and chemical properties will be determined, and in-house screening tests and international tests will be carried out.
- The NMMA testing protocol will be run; discussions will begin with equipment manufacturers.
- The NMMA test protocol will be completed, and field testing will begin.
- Field testing will continue, and equipment manufacturers will be provided with a sample of oil for in-house testing.
- Field testing will be completed, and equipment manufacturer tests will be monitored, with formulation adjustments made as required.
- In-house production will begin; the product will be launched with Terresolve or a private brand label.



PROJECT PARTNERS

Omni Tech International, Ltd.
Midland, MI

Smith, Bucklin & Associates
St. Louis, MO

Terresolve Technologies, Ltd.
Eastlake, OH

United Soybean Board
Chesterfield, MO

FOR ADDITIONAL INFORMATION, PLEASE CONTACT:

Douglas L. Faulkner
Office of Industrial Technologies
Phone: (202) 586-2119
Fax: (202) 586-3237
doug.faulkner@ee.doe.gov

Please send any comments, questions,
or suggestions to
webmaster.oit@ee.doe.gov

Visit the OIT Web site at
www.oit.doe.gov

Office of Industrial Technologies
Energy Efficiency
and Renewable Energy
U.S. Department of Energy
Washington, D.C. 20585



July 2001